

Find the inverse Laplace transforms of the given functions.

$$F(s) = \frac{4}{s^2 + 9}$$

$$F(s) = \frac{2s + 16}{s^2 + 4s + 13}$$

$$F(s) = \frac{3s - 15}{2s^2 - 4s + 10}$$

Determine the partial fraction expansions of the given functions. Can you use that to find the inverse Laplace transforms?

$$F(s) = \frac{-8s^2 - 5s + 9}{(s + 1)(s^2 - 3s + 2)}$$

$$F(s) = \frac{-5s - 36}{(s + 2)(s^2 + 9)}$$

$$F(s) = \frac{1}{(s - 3)(s^2 + 2s + 2)}$$

Solve the initial value problems using Laplace transforms.

$$y'' - 2y' + 5y = 0, \quad y(0) = 2, \quad y'(0) = 4$$

$$y'' - 7y' + 10y = 9 \cos t + 7 \sin t, \quad y(0) = 5, \quad y'(0) = -4$$

$$y'' - 6y' + 5y = te^t, \quad y(0) = 2, \quad y'(0) = -1$$